WHAT IS CLAIMED IS:

1. An integrated circuit for an electronic ballast control, comprising:

half-bridge control circuitry for driving a power half-bridge in the electronic ballast;

ballast control circuitry coupled to the half-bridge control circuitry and operable to provide signals to the half-bridge control circuitry to control operation of the half-bridge control circuitry;

an input coupled to the ballast controlled circuitry and indicative of at least one of a state of power supplied to the electronic ballast and a state of an electronic ballast load;

the ballast control circuitry controlling the half-bridge control circuitry based on the input;

power factor control circuitry coupled to the ballast control circuitry and operable to regulate ballast power to obtain an improved power factor correction for the ballast.

2. The integrated circuit of claim 1, further comprising a fault detection circuit for sensing a fault and reacting in accordance with a sensed fault.

3. The integrated circuit according to claim 1, wherein the power factor control circuit includes a boost type power converter.

4. The integrated circuit according to claim 3, wherein the power factor control circuitry is operated in critical conduction mode.

5. The integrated circuit according to claim 1, wherein the power factor control circuitry has a high gain to obtain a fast response and a low gain for power factor correction optimization.

6. The integrated circuit according to claim 1, further comprising a switch in the power factor control circuitry, an on time of the switch being increased when a voltage of the input power approaches zero.

7. The integrated circuit according to claim 1, wherein:

the half-bridge control circuitry includes an output for a high and a low half-bridge switch; and

the low side output is referenced to a voltage common to the integrated circuit.

8. A method for controlling an electronic ballast, comprising:

sensing a zero crossing of an input voltage;

increasing a switch on time as the input voltage approaches the zero crossing to provide for power factor correction with reduced crossover distortion;

increasing a gain of a power factor correction loop to obtain a fast response;

reducing a gain of a power factor correction loop to optimize ballast power factor; and

controlling an inductor by activating a switch in a boost type power factor correction circuit.

9. The method according to claim 8, further comprising disabling the power factor correction circuitry when a fault is detected in the electronic ballast.

10. A control circuit for controlling an electronic ballast for powering a lamp, the control circuit having a plurality of states, comprising:

an undervoltage control state for disabling the electronic ballast;

a preheat control state for switching a half-bridge in the electronic ballast at a first frequency and providing power factor correction with a fast response time;

an ignition ramp control state for starting the lamp connected to the electronic ballast, with the half-bridge switching at a second frequency;

a run control state with the power factor correction operating in low gain with optimized power factor correction; and

a fault control state for protecting the electronic ballast based on a set of fault criteria.

11. A power factor correction circuit integrated into an electronic ballast, the power factor correction circuit comprising:

an input voltage sensing section for sensing input voltage to the electronic ballast;

an inductor current sensing section for detecting a zero current crossing of an inductor;

a variable gain control section coupled to the input voltage sensing section and operable to provide variable close loop feedback gain in the power factor correction circuit;

a compensation indication coupled to the variable gain control section for influencing a closed loop gain of the variable gain control section;

an output section coupled to the variable gain control section and the inductor sensing section for driving a power factor correction switch, an on time of the output section being related to the input voltage, the closed loop gain and the zero current crossing.

12. The circuit according to claim 10, further comprising a fault signal input for disabling the output section when a fault is detected.

13. The circuit according to claim 11, wherein the circuit output is coupled to a switch that is coupled to the inductor and controls charging and discharging of the inductor.

14. A single chip integrated ballast control, comprising:

a half bridge driver circuit for driving a half bridge switch configuration;

a control circuit coupled to the half bridge driver for controlling the half bridge driver circuit; and

a power factor correction circuit coupled to the control circuit and operable to control input power to improve a ballast power factor.